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The Relations of Mollusks to Fish in Oneida Lake. By FRANK COLLINS BAKER. Technical Publication No. 4, New York State College of Forestry at Syracuse University. Pp. 366.

The New York College of Forestry, under the leadership of Dr. Hugh P. Baker, takes a broad view of the subject in including not only the waters conserved by the forests, but also their animal life and economic resources. The present volume is concerned primarily with the molluscan food of fish, but a large part of it discusses the relations of mollusks to the rest of the fauna and the flora, the distribution and associations of species and other topics interesting to zoologists concerning themselves with fresh-water faunas.

It appears that mollusks form 31.5 per cent. of the food of 25 of the most important food and game fishes of the state. About half of the species of fish found in Oneida Lake are in some degree mollusk feeders. The fauna of the lake comprises upwards of 62 species and varieties of shellfish, nearly all of which are known to contribute to the piscine menu, but in varying degree. The little clams of the family Sphaeriidae appear to be a favorite article of diet, also such diminutive gastropods as *Valvata* and *Amnicola*, as well as the larger *Physa* and *Planorbis*, all these appearing in the food lists of many species. The large mussels, Unionidae, are used by a smaller number of fishes. The whitefish, catfishes and pumpkinhead are notable for the large number of species of mollusks eaten.

The areas rich in life are confined to the shallows along the shores, usually not exceeding three fourths of a mile wide and twelve feet deep, affording an area of approximately 8,343 acres for feeding and breeding grounds for fish. In deeper water, vegetation is scarce or absent, and only scattered individuals of three species of mussels were taken with the crowfoot dredge. Possibly the total absence of gastropods was due to the form of dredge used; yet the same poverty of deep water was noted by Miss Maury in Cayuga Lake. It seems likely that the mollusks of these post-glacial lakes have not had time to become adapted to

deep water conditions, as they have in the Swiss lakes and many other bodies of fresh water.

No general valuation of the total molluscan fish food of the lake is attempted, but there are some interesting estimates of limited areas, from counts made of selected plots of a foot square. A bouldery station 300×500 feet has a mollusk population of 7,650,000 individuals. On a sandy bottom area $1,000 \times 500$ feet the counts indicated 65 million. Finally, in the outlet, where there is a uniform area of fully $3,500 \times 500$ feet, there are estimated to be $304\frac{1}{2}$ million mollusks.

The chief species are illustrated by photographic figures. Mr. Baker's work is well done, as we should expect from his long experience with freshwater mollusks, and his excellent volume on the North American Lymnaeas. The book will be found a useful addition to the literature of freshwater zoology.

HENRY A. PILSBRY
ACADEMY OF NATURAL SCIENCES OF
PHILADELPHIA

SPECIAL ARTICLES

THE OVERLAPPING OF THE LEAF SHEATH AND ITS LACK OF VALUE FOR DESCRIPTIVE BOTANICAL LITERATURE

DURING the crop season of 1916 the writers grew, at Texas Substation No. 8, Lubbock, Texas, uniformly tall and dwarf plants of milo from the same seed, by varying the time of planting and the environmental conditions. Measurements were secured from both the tall and the dwarf plants, by taking ten consecutive main plants in an average row and recording the internode and sheath lengths. The total number of internode and sheath measurements amounted to 78 in the tall group and 93 in the dwarf group. The results showed the mean internode length in the tall group to be $18.33 \pm .061$ centimeters, as against a mean internode length in the dwarf group of $6.88 \pm .048$ centimeters. The mean sheath length was $17.46 \pm .050$ centimeters in the tall and $15.95 \pm .026$ centimeters in the dwarf.

Tall and dwarf plants of kafir were also grown from the same seed and a similar set of measurements, totaling 106 in the tall and 100 in